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California Energy Commission
Dockets Office
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512

RE: Docket 04-IEP-01 -D. Electricity and Natural Gas Forecast and Options

Dear Commissioners:

Attached for your review is Southern California Gas Company's response to the California Energy Commission's (CEC) questions regarding the modeling tools, approach, and methodology used in the natural gas market analysis. These responses are the Gas Company's initial comments for the December 16, 2004 CEC natural gas market analysis workshop. We may file additional comments after the workshop.

Should you have any questions regarding the attached, please feel free to contact me at (916) 492-4244.

Sincerely

Bernie Orozco

Attachment

Sempra Energy – Southern California Gas

BACKGROUND INFORMATION AND KEY QUESTIONS
Natural Gas Modeling Approach, Methodology and Tools
Docket 04-IEP-01 –D. Electricity and Natural Gas Forecast and Options
Thursday, December 16, 2004

1. General Modeling Questions

a) **What are the market characteristics to be included in the short-term and long-term modeling exercises?**
b) **What are the major issues to be addressed in modeling the infrastructure, supply, and price trends?**
c) **How should a base case or a reference case be used in the market analysis?**
d) **How should the scenarios and sensitivities be designed to capture current and future market issues? Are there alternative approaches?**

Response:

a) Natural gas markets in California will continue to be split into Core and Noncore categories, where Core customers tend to have much smaller consumption than Noncore customers. Core customers will have much wilder short-term swings in their consumption tied to weather as measured by monthly heating degree-days. Their long-term consumption will be driven by population growth, housing construction, and energy efficiency efforts. Larger Commercial and Industrial customers will tend to be more importantly influenced by the market price of natural gas, the growth or decline in economic activity, energy efficiency efforts, and trends in manufacturing versus services. Gas used for electricity production is highly variable in the short-term, depending on weather and hydro conditions. Long-term use of natural gas for electricity production will depend on electricity demand growth, energy efficiency, and state policies impacting the type and location of electric generation to be built in the future.

Nationally, demand for natural gas has been largely driven by gas used for electricity production; it has been the largest growth area in the use of natural gas in the last decade. Modeling should incorporate alternate fuels prices, environmental externality costs, and national policies on electric production.

b) In California's natural gas markets and national gas markets, the potential for liquid natural gas (LNG) facilities to affect the amount of gas and the way gas flows are important considerations. LNG brought in on the West Coast will affect the California gas infrastructure. On the national level, LNG will also be a major factor. Markets seem to be more integrated nationally with pipelines to the East from Western Canada and the Rockies. Analysis of the national pipeline infrastructure and needed infrastructure changes to integrate prices with different LNG entry points could also be important.

In electricity markets, the extent to which transmission constraints are not addressed by California and the extent to which generation is distributed toward locations where consumption takes place will have effects on the amount of natural gas used for electric production and the California gas infrastructure.

California policies for diversity of supply sources for electricity customers (renewables) and core gas customers could also impact the gas infrastructure.

c) A "base" or reference case should be designed to reflect the key current characteristics of gas and electricity markets in California, including assumptions that can be viewed as non-controversial. It should also reflect assumptions about the future that "play out" policies and contractual commitments already in

place. For example, the construction of an LNG re-gasification plant in Baja California, Mexico is already in process and should be part of a "base" case. The commitment to CPUC-mandated energy efficiency investments funded by customers should also be included.

d) First, a well-defined set of sensitivity simulations should be executed to determine the sensitivity of model results (e.g., gas market prices and throughput) to changes in the magnitudes of a set of key assumptions that form the "base" case and the timing of assumed future project start-up dates. This exercise should include an effort to identify the "top 10" assumptions in the "base" case that most impact model results.

Second, construct meaningful scenarios from internally consistent assumptions. Some of the assumptions may require the model be capable of undergoing structural change. For example, demand for electricity and the amount of gas-fired generation could rise significantly if water-desalination were to become a critical feature of a long-term outlook.

Rather than view the sensitivities and scenarios as a set of predictions of the future, their results should be viewed as information about how gas and electricity markets in California can be expected to respond to "stress."

2. Pricing Issues

What is the best methodological approach for developing a reasonable forecast? How should these approaches best be modeled?

a) Should the model forecast a "market fundamental" price, or focus on a spot or forward market price?

b) What is the relationship between futures projections, spot prices, and prices projected by modeling exercises? What are the factors to be reconciled with such analytical procedures?

Response:

a) For a long-term forecast, a full modeling of the national energy markets is required in order to fully incorporate interfuel substitution. Even if the CEC does develop such as long-term forecast, we recommend using a consensus approach to the long-term price forecast, which would rely on other experts in private firms such as CERA (Cambridge Energy Research Associates), or PIRA (Petroleum Industry Research Association), and public agencies such as the US EIA or Canada's National Energy Board (NEB)--as proposed in the CPUC's Renewable Portfolio Standard (RPS) proceeding.

The gas price forecasts will be not be the same, but we believe the best approach is to include different points of view in order to arrive at an objective, consensus forecast. The forecasts should be averaged to produce a single forecasted, inflation-adjusted price series. Forecasted changes in this real gas price series should then be applied to recorded prices.

Short-term reliance on 60-day averages of forward markets for 2-3 years with transition to the long term forecast based on fundamentals as proposed in the CPUC RPS proceeding or the CPUC Avoided Cost proceeding is appropriate to incorporate into the forecast.

b) See Response (a) above.

c) Long-term forecasts should rely on models that are driven by "market fundamentals." Such gas price models have the advantage of being explainable by real-world factors that influence national supply and demand. Forward market prices can be useful as an indicator for short-term market fluctuations. Since the CEC's gas price forecasts are used for long-term forecasts, we recommend placing less emphasis on futures prices, or using them short-term and transitioning to the fundamentals forecast as described above.

There has been much discussion lately about using futures for gas price forecasts--since they are publicly available, widely traded and had some success this year. Recently, when compared with "fundamentals" forecasts by the EIA, NEB and your own CEC forecasts, the futures have appeared to be more accurate since they are updated daily. But if one compares futures prices in January 2004 for the rest of 2004 -- about the time the agencies made their forecasts available -- the futures also underestimated 2004 prices as the experts did. And for forecasts more than 2-3 years out, futures markets are fairly illiquid and should not be relied on.

d) Futures contracts tend to have a cyclical seasonal pattern similar to model-generated price projections. Currently the two methodologies are tending to concur in their projections, even in the longer run; futures prices further out are trending download toward the $4 to $5 price range projected by "fundamental driven" models.

However, because of futures' illiquidity more than 2-3 years out, futures prices' advantages are best limited to short-term forecasts. Forward markets take into account many short-term attributes such as weather forecasts and supply disruptions that are not part of a long-term fundamentals analysis. Incorporating that information will improve the overall forecast for the short-term.

3. Demand Projections

a) What are the issues to be considered in analyzing demand trends and projections?

b) What is the desired way to approach demand assumptions? How should the elasticity be estimated? To what level should competition and switching of natural gas with other fuels be considered in long-term and short-term analysis?

c) How should fuel switching issues be addressed in our analysis?

Response:

a) Consider factors that affect the demand trend in California (this response does not address national demand, though similar factors would be involved). They are weather in the short-term (heating degree days and/or cooling degree days); demographic and economic factors (i.e., household growth, employment, consumer price index); active customer meters; and fuel prices (for gas as well as for potential substitutes such as oil, electricity, propane, butane),

For the long term, policy-related issues should also be considered. Policy-related impacts (such as future energy efficiency mandated savings) can be made as post-model adjustments, in order to clearly identify their specific effects on gas demand.

Since the energy crisis in late 2000, energy efficiency has become a very important task in California. In late September 2004, the CPUC mandated the coming ten years (2006 – 2013) energy demand reduction goals and budgets for investor-owned utilities in California.

In the long term, US immigration policies could significantly impact California's population growth and corresponding gas demand. Possibilities include further tightening of post-9/11 security restrictions, or if the US eventually were to change to a more "skills/education" oriented immigration policy, which would tend to disperse immigrants across the US--rather than the current "family-reunification" emphasis, which results in to new immigrants naturally clustering in areas where their already US-Resident relatives live—that is, parts of the US such as California that already have many immigrants.

Gas demand is also affected by policies that impact use of substitute fuels. Air Quality Management Districts' (AQMDs') air quality policies that prohibit or restrict coal and oil fuels also affect California's gas consumption. State electric renewables mandates have an impact as well; the more electricity from renewable energy, the less demand for gas-fired electric generation (EG).

Other long-term policies include potential State-legislated CO2 restrictions, and State electric transmission policies that could affect the location and type of fuel used for electricity production.

b) To approach demand assumptions, we recommend building standard economic models/methodologies to derive the non-policy demand input assumptions.

The price elasticity can be estimated through econometric modeling by regressing the historical gas throughput for a customer class on gas rate, controlling for other important factors. The elasticity for gas for electricity production is in large part a policy variable depending on the extent to which the CPUC and the legislature allow retail customers to see the marginal electric generation price.

Long-term fuel switching is also a policy variable related to CARB, air quality district, and CPUC policies on electric generation and industrial fuel switching.

c) We have no opinion.

4. Supply Analysis

a) What are the approaches to developing the "cost curves" for natural gas supplies and how they should be developed?

b) What limitations are encountered by using any of these approaches?

Response:

a) We have no opinion.

b) We have no opinion.

5. Miscellaneous Issues:

a) Is there any modeling issue not included in the above list?

b) Should (and if so, how should) the natural gas market analysis include modeling of criteria and/or non-criteria air emissions?

c) How should the natural gas analysis be integrated with other energy sector analysis?

d) If the Energy Commission does not rely on an internal forecast, which other forecast should it rely upon?

Response:

a) In any supply forecasting beyond 2006, the CEC should examine various scenarios and make clear, specific assumptions regarding liquid natural gas (LNG) supplies (both timing and volumes) coming into California and Baja California, Mexico.

Long term forecasting should also take into account planned interstate pipeline expansions and assumptions about future interstate pipeline expansions—and their impacts on gas flows into California and access to North American supply basins.

b) Air emissions should play a role in natural gas forecasting, insofar as California's various AQMD's restrict competing fuels (oil, coal, etc.) based on their emissions – and thereby tend to increase in-State gas demand for gas-fired electric generation (EG).

Assumptions about California and national policy on CO2 emissions would be speculative and premature at this point in time.

c) Electricity sector: Natural gas use certainly needs to be tied to *electric* supply and demand. In California, gas-fired EG functions as the "on-the-margin" supply source to meet swings in electric demand. As such, gas-fired EG—and its corresponding natural gas demand—can swing widely if there are significant changes in electricity demand (i.e., hot summer weather) and/or electricity supplies normally driven by other

fuels (i.e., hydroelectric—dry hydro year increases EG and EG's gas demand; temporary nuclear shutdowns can increase EG and EG's gas demand). Mandated electric supplies from renewable sources (hydro, wind, solar…) –and any future State changes in the levels of those renewables mandates—will also affect EG-related gas demand, since more renewables-generated electricity could mean a corresponding drop in gas-fired EG. Likewise, policy on electric transmission expansion impacts the location and type of EG and the resulting gas demand.

Alternative-fuel vehicles: More peripherally than EG--gas demand in natural gas vehicles (NGVs) could be integrated with analyses of the markets for gasoline-electric hybrids and eventually hydrogen-powered vehicles.

d) If the CEC does not do its own forecast for California, we recommend using aggregated forecasts from California's natural gas utilities (along the lines of the *California Gas Report*).

If the CEC does not do its own forecast for national gas demand and supply and the resulting price, we recommend using a weighted average of other private and public forecasts as described in Response (2a) above.